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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/068,127	02/06/2002	Alan L. Starner	A-69448/MSS	5767

7590 09/09/2003

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EXAMINER
MASINICK, MICHAEL D

ART UNIT	PAPER NUMBER
2125	7

DATE MAILED: 09/09/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)
	10/068,127	STARNER, ALAN L.
	Examiner	Art Unit
	Michael D Masinick	2125

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *Aug 18, 2003* .

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-26* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-26* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other:

DETAILED ACTION

1. Applicant's arguments filed August 18th, 2003 have been fully considered but they are not persuasive. The assertion that a "finite acceleration" is not found in Bassett is not persuasive to the examiner. Taking the 2nd derivative of Figure 7 temperature chart as shown in Stoddard will yield a finite acceleration. While the art as shown in Stoddard only shows 2 distinct ramp rates, this clearly could be extended to have as many different ramp rates as desired by one skilled in the art, thereby creating a finite acceleration as claimed in the current invention.

2. All rejections stand as previously written with the amendments of the claims intact.

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

2. Claims 19, 20, and 22-26 are rejected under 35 U.S.C. 102(e) as being anticipated by U.S. Patent No. 6,207,937 to Stoddard et al.

3. Referring to claim 19, Stoddard shows a temperature controlled furnace for changing the temperature of a body comprising: a heating chamber housing one or more controllable heating elements (Figure 2), and one or more temperature sensing devices (Figure 2); and a temperature controller configured to receive a set point temperature profile and temperature data inputs representative of said temperature sensing devices housed in said heating chamber (User

Interface, Control System Figure 2 and "recipe" in Col 1) and configured to vary power delivery to said one or more controllable heating elements such that the temperature of said body is ramped through a temperature acceleration phase, wherein the temperature is accelerated at a finite pace, a constant ramp rate phase, and a temperature deceleration phase, where the temperature is decelerated at a finite pace, to achieve a desired temperature substantially smoothly with minimal oscillation around said desired temperature (Figure 8 and Col 1, lines 57-65).

4. Referring to claim 20, Stoddard shows wherein said controllable heating elements are electrical heating coils (Col 7, lines 16-20).

5. Referring to claim 22, Stoddard shows wherein said temperature sensing devices are one or more thermocouples (Claim 2) providing one or more temperatures for each of said one or more controllable heating elements (the concept of providing the temperatures to the control environment would be inherent to any temperature reading device).

6. Referring to claim 23, Stoddard shows wherein said one or more temperature data inputs to said temperature control algorithm is a mathematical combination of said one or more thermocouple temperatures (Col 23, lines 21-36).

7. Referring to claim 24, Stoddard shows wherein said control temperature is further defined to have a known offset from said thermocouple temperatures ("difference" - Col 23, lines 21-36).

8. Referring to claim 25, Stoddard shows that said temperature offsets are static offsets that correct said control temperature for differences between the temperature of said body and said thermocouple temperatures ("profile error" - Col 23, lines 21-36) .

9. Referring to claim 26, Stoddard shows that said body is a semiconductor wafer (Col 1, line 18).

Claim Rejections - 35 USC § 103

10. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

11. Claims 1-18 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S Patent No. 6,207,937 to Stoddard et al in view of U.S. Patent No. 4,669,040 to Pettit et al.

12. Referring to claim 1, Stoddard shows a method of changing the temperature of a body housed in a heating chamber in a temperature controlled furnace from a starting to an ending set point temperature using a temperature control algorithm (Col 1, line 44-Col 2 line 6) characterized in that: said heating chamber houses one or more controllable heating elements (Col 7, lines 16-20), and one or more temperature sensing devices (Claim 2); a set point temperature is accelerated from said starting temperature toward said ending temperature at a finite rate until a defined maximum ramp rate is achieved (Figure 8 and Col 1, lines 57-65); said set point temperature is substantially maintained at said maximum ramp rate; said set point temperature is decelerated from said maximum ramp rate at a finite rate to said ending temperature (Figure 8); and said temperature control algorithm substantially maintains the temperature of said body in conformance to said set point temperature (Figure 8 and Col 1, lines 57-65).

13. Referring to claim 10, Stoddard shows a method of changing the temperature of a body housed in a heating chamber in a temperature controlled furnace from a starting to an ending temperature using a temperature control algorithm comprising the steps of: providing temperature data from one or more temperature sensing devices in said heating chamber and a temperature set point as inputs to said temperature control algorithm which controls power delivery to one or more controllable heating elements (Col 7, lines 16-20) in said furnace; accelerating said temperature set point from said starting set point temperature at a finite programmed acceleration rate until a defined maximum temperature ramp rate is achieved (Figure 8 and Col 1, lines 57-65); maintaining said set point temperature at said maximum temperature ramp rate; and decelerating said temperature set point from said maximum ramp rate at a finite programmed deceleration rate until said ending set point temperature is reached (Figure 8).

14. Stoddard does not show the set point temperature is substantially maintained at said maximum ramp rate until said ending temperature is approached or that this is done to prevent oscillations and overshoot.

15. The concept of changing the temperature of a furnace or oven when the temperature ramp is approaching its target temperature is well known.

16. Pettit shows a self-tuning controller for a manufacturing environment clearly showing the use of "Approach Control" (Col 2, lines 30-40) to prevent overshoot.

17. It would have been obvious to one of ordinary skill in the art at the time the invention was made to use the controller of Pettit (including approach control) in the thermal reactor

(furnace) of Stoddard because Stoddard states in column 2 that it would traditionally be used with a PID controller. Pettit is designed as a PID controller (Col 1, lines 24-27).

18. Referring to claims 2 and 11, Stoddard shows wherein said controllable heating elements are electrical heating coils (Col 7, lines 16-20).

19. Referring to claims 4 and 13, Stoddard shows wherein said temperature sensing devices are one or more thermocouples (Claim 2) providing one or more temperatures for each of said one or more controllable heating elements (the concept of providing the temperatures to the control environment would be inherent to any temperature reading device).

20. Referring to claims 5 and 14, Stoddard shows wherein a control temperature which is a mathematical combination of said one or more thermocouple temperatures is an input to said temperature control algorithm (Col 23, lines 21-36).

21. Referring to claims 6 and 15, Stoddard shows wherein said control temperature is further defined to have a known offset from said thermocouple temperatures ("difference" - Col 23, lines 21-36).

22. Referring to claims 7 and 16, Stoddard shows that said temperature offsets are static offsets that correct said control temperature for differences between the temperature of said body and said thermocouple temperatures ("profile error" - Col 23, lines 21-36).

23. Referring to claims 8 and 17, Stoddard shows said body is a semiconductor wafer (Col 1, line 18).

24. Referring to claims 9 and 18, Stoddard shows a temperature controlled furnace for changing the temperature of a body comprising: a heating chamber housing one or more

controllable heating elements (Fig. 1A), and one or more temperature sensing devices ("Thermocouples"); and a temperature controller (Fig 2) configured to carry out the method of claim 1.

25. Claims 3 and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S Patent No. 6,207,937 to Stoddard et al in view of U.S. Patent No. 4,669,040 to Pettit et al as shown above and further in view of U.S. Patent No. 4,842,686 to Davis et al.

26. In addition to what has been shown above in relation to the parent claims, Stoddard in view of Pettit does not show the use of radiant heat lamps as heating elements.

27. Davis shows the use of radiant heat lamps for raising the temperature of semiconductor wafers during the production process in a heating chamber (Col 58, lines 36-41).

28. It would have been obvious to one of ordinary skill in the art at the time of invention to use the radiant heat lamps of Davis as the heating source of Stoddard in view of Pettit because they are the equivalent to heating coils as a heat source and are well known for this use in the semiconductor manufacturing art.

29. Claims 21 is rejected under 35 U.S.C. 103(a) as being unpatentable over U.S Patent No. 6,207,937 to Stoddard et al in view of U.S. Patent No. 4,842,686 to Davis et al.

30. In addition to what has been shown above in relation to the parent claims, Stoddard does not show the use of radiant heat lamps as heating elements.

31. Davis shows the use of radiant heat lamps for raising the temperature of semiconductor wafers during the production process in a heating chamber (Col 58, lines 36-41).

32. It would have been obvious to one of ordinary skill in the art at the time of invention to use the radiant heat lamps of Davis as the heating source of Stoddard because they are the equivalent to heating coils as a heat source and are well known for this use in the semiconductor manufacturing art.

Conclusion

33. THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Michael D Masinick whose telephone number is (703) 305-7738. The examiner can normally be reached on Mon-Fri, 7:30-4:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Leo Picard can be reached on (703) 308-0538. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 305-3900.

MDM

LEO PICARD
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